

2004 August & September

Sun and Moon

During August, observers in the British Isles will find the nights lengthening considerably. Indeed, for those in the far north, the return of truly dark night-time skies from the second week of the month will be particularly welcome astronomically after summer's permanent twilight. The Sun is now heading rapidly southwards along the ecliptic, and will sit astride the celestial equator at 16h 30 Universal Time (UT=GMT; BST minus 1 hour) on September 22, the moment of the northern hemisphere autumn equinox. By common definition, autumn begins on the equinox, but the nights will already have taken on a less summery feel by then and perhaps astronomers would take more the meteorological approach and regard the season as starting as September opens.

Sunspot cycle 23 continues to produce occasional substantial active areas, which can be viewed safely by projecting the solar disk onto white card through a small telescope. The decline towards sunspot minimum – a few years off yet – has been erratic, punctuated by interludes when the disk has been quite active, although observers have also begun to record days when spot groups have been completely absent.

The Moon is New on August 16 (good news for meteor observers!) and September 14, placing the darkest night-time skies in this interval into the middle fortnight of the month. Full Moon falls on July 31, August 30 and September 28. The early-autumn waning gibbous Moon in the days following Full rises early, giving bright evenings. In early September, moonrise comes well before midnight UT even up to the 8th of the month, by which time the Moon is a broad crescent, past last quarter.

At this time of year, retardation – the night to night difference between successive moonrises – is at a minimum, thanks to the shallow angle between the ecliptic and the eastern evening horizon: although the Moon's orbital motion carries it eastwards by about 13° per day, it will rise only a few tens of minutes later, a bit further over to the north-east, from one night to the next. (By contrast, in spring when the ecliptic is steeply inclined to the eastern horizon the waning Moon rapidly departs the evening sky). Autumn's early-rising waning Moon offers the chance to view lunar features under their sunset illumination at more sociable hours of the night.

The planets

Mercury is poorly-placed in the evening sky east of the Sun in early August. Reaching inferior conjunction between Earth and Sun on August 23, the planet then pulls out into the morning sky, reaching greatest elongation 18° west of the Sun on September 9. Around this time, the magnitude 0 innermost planet will be rising about 90 minutes ahead of the Sun and may be seen by keen-eyed observers in the pre-dawn skies against the stars of Leo.

The morning sky at this time is dominated by brilliant mag -4 Venus, reaching its greatest elongation 46° west of the Sun on August 17. Venus will then be rising around 01h UT, over three hours ahead of the Sun. Telescopically the planet should show a half-phase at this time, gradually becoming more gibbous (similar in appearance to the Moon between full and last quarter) as early autumn advances. As its phase increases, Venus' apparent diameter decreases below 20 arcseconds: the planet is pulling away from us around its inner, more rapid orbit. Venus will be presented against the stars of Gemini in August, slowly moving into Cancer in September, and will continue to rise more than three hours ahead of the Sun throughout this interval.

Mars, long almost lost in the solar glare, finally arrives at conjunction on the Sun's far side on September 15 and will emerge only slowly into the morning sky much later in the year. Jupiter is also lost from view in this interval, reaching conjunction on September 22.

Saturn is a morning object against the stars of Gemini, rising around midnight UT by mid-September. At mag 0, the planet is brighter than any of the stars in its vicinity, and any telescope with 50mm or more aperture and a magnification of $\times 40$ upwards will reveal its magnificent ring system. With Saturn now beginning to head south along the ecliptic, the rings' presentation is slightly less wide-open than in the past couple of years, but we still have a good view of their southern side. Observers with large telescopes may be able to make out some of the subtle banding of the planet's cloud features, especially in the latter part of the night in September when Saturn is high in the southeastern sky: seeing, the steadiness (rather than transparency) of the atmosphere, has usually settled to its best by the early hours once the ground has given up accumulated daytime heat, affording the best chance of

seeing fine telescopic detail. Many will be keen to compare the Earth-based view with those being returned from the *Cassini* spacecraft that is now in orbit around the planet. For up to date information and images from *Cassini*, see <http://saturn.jpl.nasa.gov/home/index.cfm>.

The outer gas/ice giants Uranus and Neptune are well-placed in this interval and can be seen in binoculars. Uranus, at mag +5.7, is the brighter and is at opposition (180° from the Sun in Earth's sky) on August 27, just north of 5th-magnitude Rho Aquarii. Further west, in the near vicinity of mag +4 Theta Capricorni, Neptune is at opposition on August 6 and is a more testing mag +7.8. Being rather distant, neither of these planets shows more than a small (3 arcseconds) disk telescopically.

Minor planets

The brightest of the asteroids, (4) Vesta, is at opposition during September, and can be found with binoculars looping against the star background in eastern Aquarius, south of the Circlet of Pisces. A chart showing Vesta's path and suitable comparison stars for making nightly magnitude estimates can be found at <http://www.britastro.org/arms/04-0409.jpg>

Observations will be welcomed by Andy Hollis, Director of the Asteroids and Remote Planets Section. Around opposition, Vesta should be close to 6th magnitude.

Comet 2002Q4 (NEAT)

Having put in a respectable, faintly naked-eye showing in May's evening sky, Comet 2002 Q4 (NEAT) is now circumpolar for northern observers, moving slowly eastwards north of the Plough, and gradually fading. In early August, the comet may still be a reasonable binocular target around 7th magnitude, though it will at this time be quite low in the twilight northern sky. By late September, it will have faded further, but could still be in range for small telescopes around magnitude +9, and best seen in the early hours as it starts to climb in the northeastern sky.



Meteors

The more active part of the year is here at last, and after losing most of the really active showers to moonlight in 2003, meteor observers will be looking forward to a productive spell starting in early August with the Perseids. The Moon will initially be slow to get out of the way, and observations during the first week of August will still be somewhat restricted by its glare. From about August 9 onwards, however, the available dark sky period increases as the Moon wanes, and by this time the Perseids will be starting their rise towards maximum on August 12. Best rates are expected late on August 11–12 and early on August 12–13, with good activity anywhere from Aug 8–9 to 15–16. The Perseid radiant, close to the ‘Sword Handle’ at Perseus’ northern end, is low in the north-east in early evening, climbing high in the early morning hours. Reports of watches made by the standard methods described on the pages at <http://www.britastro.com/meteor> (and also in the article on page 220) will be welcomed by the Meteor Section. Further details of this year’s shower can be found on page 181 of this *Journal*.

Following the Perseids, patient observers may note some activity from the Kappa Cygnids around August 20. This shower produces low rates (around 5 meteors/hr at best), but is noted for its occasional very bright meteors.

Through August and September, sporadic rates are at their best for the year, and a experienced watcher might log up to a dozen meteors per hour even on ‘non-shower’ nights from a clear, dark location. This background is augmented by minor shower activity from the Piscids through September and October. Part of the year-round ‘drizzle’ of low-level activity from close to the ecliptic plane, the Piscids produce perhaps a couple of slow, modestly-bright meteors per hour from a diffuse radiant east of the Circlet of Pisces.

Variable stars

The long period (Mira-type) variable Chi Cygni had a bright maximum, almost reaching magnitude +4, in late May, and could remain within binocular range well into August. Characteristically, the fade from maximum is slower than the preceding rise. Chi is located close to Eta Cyg on the Swan’s neck.

The prototype of the class, meanwhile, emerges into the early morning sky during August following solar conjunction. Mira (Omicron Ceti) should have been at maximum towards the end of May, and will probably

be close to the limit of naked eye visibility between mag +5 to +6 by the time it is more readily accessible in early autumn. Binocular and small telescope users will have the chance to follow Mira all the way down to its 9th-magnitude minimum early next year.

The naked-eye eclipsing binary Algol (Beta Persei) has favourably-timed minima on the nights of August 30–31 and September 2 and 22. During the primary, deep eclipse, Algol fades from mag. +2.1 to +3.4, a very noticeable dip. The fade and recovery each take about five hours.

Deep sky

As we move into August, the summer Milky Way in Sagittarius remains a major attraction in early evening. The region to the northwest of the ‘Teapot’ asterism made up by Sagittarius’ main bright stars, stretching up towards the bulge of the Scutum Star Cloud south of Aquila, abounds with bright, well-known objects. A binocular sweep northwards from the Teapot’s spout will trawl up, in quick succession, the Lagoon Nebula (M8), Trifid Nebula (M20), Swan Nebula (M17) and Eagle Nebula (M16), each readily visible in a pair of 10×50s on a clear, moonless night.



Summer delight: the Lagoon nebula, M8, photographed from La Palma by Nik Szymanek.



The Eagle Nebula, M16. CCD image by Gordon Rogers.

By September, the window is closing on these summer delights for another year, and the view in late evening turns towards the emptier spaces of Pegasus and the other autumn constellations. Trailing behind Pegasus, and well up in the eastern sky by late on a mid-September evening, Andromeda is best known to most observers for the Great Galaxy M31: a couple of degrees from 4th-magnitude Nu And, in the more northerly (uppermost from the UK) chain of stars trailing east from the corner of the Square of Pegasus marked by mag +2 Alpha Andromedae.

The end star of Andromeda’s more southerly chain is well worth examination in a medium-sized telescope (70–80mm aperture). This is Gamma Andromedae (Almach), one of the finest colour-contrast double stars in the sky. The primary is a mag +2.3 orange star, with the green mag +4.8 secondary just under 10 arcsecs away – an easy split at ×50.

Another fine early-autumn double is Gamma Arietis (Mesarthim). I find this attractive not for any pronounced colour (both stars are white), but for the close match in brightness of the two components (mag +4.6 and +4.7), which are separated by a little less than 8 arcseconds and are aligned exactly north–south.

The autumn sky has one or two good open star clusters. One of the best for small telescopes and binoculars (indeed, it becomes rather scattered and unimpressive in large instruments) is M34 (NGC 1039), midway between Algol and Gamma Andromedae. This is a loose collection of about 40 stars between mag +6 and +8 in an area 35 arcminutes across, somewhat more than the Moon’s apparent diameter. Under good conditions, M34 is visible to the naked eye. Its overall catalogue magnitude is +5.2.

By late evening in September, the best-known of all star clusters – the Pleiades in Taurus – is well up in the northeastern sky, a indicator that autumn is truly under way with the promise of long, dark observing nights ahead.

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